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(54) Title: LIPID CARRIER COMPOSITIONS AND METHODS FOR IMPROVED DRUG RETENTION

(57) Abstract: Liposomal compositions which have enhanced retention properties for biological agents are characterized by an intrasomal osmolality of 500 mOSM/kg or less and by containing substantially no cholesterol. The liposomes comprise vesicle forming lipids along with aggregation preventing components, and typically have transition temperatures of 38 °C or higher.

INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A61K9/00 A61K9/127

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, MEDLINE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6 270 806 B1 (LIVERSIDGE ELAINE ET AL) 7 August 2001 (2001-08-07) claims 1,14; example 2 ---	1-15
X	WO 01 05372 A (ALZA CORP) 25 January 2001 (2001-01-25) Tables 2, 3 claims 1,5,7,8,20 ---	1,3-5, 11,15
X	US 6 106 858 A (KATRE NANDINI ET AL) 22 August 2000 (2000-08-22) claims 1,6-46; examples 1-8 --- -/--	1,3-5,7, 11,14

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
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- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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- *G* document member of the same patent family

Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

International Application No

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	BONDURANT B ET AL: "Photoinitiated destabilization of sterically stabilized liposomes" BIOCHIMICA ET BIOPHYSICA ACTA. BIOMEMBRANES, AMSTERDAM, NL, vol. 1511, no. 1, 9 March 2001 (2001-03-09), pages 113-122, XP004273405 ISSN: 0005-2736 page 114	1,3-5, 11,14
X	WO 95 15762 A (INST NACIONAL DE ENGENHARIA E ;MEIRINHOS DA CRUZ MARIA EUGENI (PT)) 15 June 1995 (1995-06-15) page 6, paragraph 2; claims 1,16,38 page 7, paragraph 2 page 9, last paragraph	1,5,11
X	US 5 393 530 A (LAMY BERNARD ET AL) 28 February 1995 (1995-02-28) column 14, line 44-50; claim 1	1,2,5,6, 16
X	US 5 993 850 A (KIM SINIL ET AL) 30 November 1999 (1999-11-30) Summary of invention claims 1-4,10,23; examples 1-3	1,4,7, 11,15
X	US 4 927 571 A (HUANG ANTHONY H ET AL) 22 May 1990 (1990-05-22) column 3 -column 4; claims 1,5	1,11
X	US 6 306 432 B1 (ASHERMAN JOHN ET AL) 23 October 2001 (2001-10-23) claims 1-9,21,42; examples 5,7 Tables 3, 4	1,5,7, 11,14
X	WO 90 15595 A (VESTAR INC) 27 December 1990 (1990-12-27) Table 5, Summary of the invention claims 1,7,14,32,39	1,5,6, 11,14
X	US 5 882 679 A (NEEDHAM DAVID) 16 March 1999 (1999-03-16) column 1 -column 2; claims 1,30; example 8	1,4,11
X	WO 91 04019 A (UNIV CALIFORNIA) 4 April 1991 (1991-04-04) page 10, line 16-27; claims 1,2,7,14	1,5
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>GABER M H ET AL: "THERMOSENSITIVE STERICALLY STABILIZED LIPOSOMES: FORMULATION AND IN VITRO STUDIES ON MECHANISM OF DOXORUBICIN RELEASE BY BOVINE SERUM AND HUMAN PLASMA" PHARMACEUTICAL RESEARCH, NEW YORK, NY, US, vol. 12, no. 10, 1995, pages 1407-1416, XP000979539 ISSN: 0724-8741 cited in the application page 1407 -page 1408</p>	1,3,14
Y	<p>KENWORTHY A K ET AL: "Structure and phase behavior of lipid suspensions containing phospholipids with covalently attached poly(ethylene glycol)." BIOPHYSICAL JOURNAL. UNITED STATES MAY 1995, vol. 68, no. 5, May 1995 (1995-05), pages 1903-1920, XP009012613 ISSN: 0006-3495 cited in the application Abstract</p>	1-15

INTERNATIONAL SEARCH REPORT

International application No.
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Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.: 12, 13
because they relate to subject matter not required to be searched by this Authority, namely:
Rule 39.1(iv) PCT - Method for treatment of the human or animal body by therapy
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

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